What is claimed is:

1. A method for calculating the financial status of a company, comprising the steps of: calculating the company's value in accordance with the formula

$$\frac{dV}{V} = (r+\lambda)dt + \sigma dW - dN$$

wherein

V is the value of the company,

r is the risk neutral rate,

λ is the intensity of jump arrivals,

σ is the company's volatility,

N) is the standard Poisson process,

W is the standard Wiener process,

and t is a time between 0 and T, the maturity of the debt; and

using the company value to calculate a financial metric for the company.

2. The method of claim 1 wherein the financial metric is the equity value of a company in accordance with the formula

$$S = VN(d_+) - e^{-(r+\lambda)T} DN(d_-) - V(LD/V)^{2(r+\lambda)/\sigma^2+1} N(f_+) + e^{-(r+\lambda)T} D(LD/V)^{2(r+\lambda)/\sigma^2-1} N(f_-);$$

wherein like variables to those defined above define the same values and wherein

$$d_\pm = \left[\ln(S/D) + (r+\lambda \pm \sigma^2/2)T\right]/\sigma\sqrt{T}$$

$$f_\pm = \left[\ln(L^2 D/V) + (r+\lambda \pm \sigma^2/2)T\right]/\sigma\sqrt{T}$$

D is the value of the debt,

T is the maturity of debt, and

L is relative level at which the company defaults.

3. The method of claim 1 wherein the financial metric is the debt value of a company in accordance with the formula

$$\delta = VN(d_-) + e^{-(r+\lambda)T} DN(d_-) + V(LD/V)^{2(r+\lambda)/\sigma^2+1} N(f_+) - e^{-(r+\lambda)T} D(LD/V)^{2(r+\lambda)/\sigma^2-1} N(f_-);$$

wherein like variables to those defined above define the same values and wherein

$$d_\pm = \left[\ln(S/D) + (r+\lambda \pm \sigma^2/2)T\right]/\sigma\sqrt{T}$$

$$f_{\pm} = \left[\ln\left(L^2 D / V\right) + \left(r + \lambda \pm \sigma^2 / 2\right)T\right] / \sigma\sqrt{T}$$

D is the value of the debt,

T is the maturity of debt, and

L is relative level at which the company defaults.

4. The method of claim 1 wherein the financial metric is the survival probability of a company in accordance with the formula

$$Q(t) = e^{-\lambda T}\left[N(g_+) - (LD/V)^{2r/\sigma^2} N(g_-)\right] \quad t < T$$

wherein like variables to those defined above define the same values and wherein

$$g_{\pm} = \left[\pm\ln\left(V / LD\right) + \left(r + \lambda - \sigma^2 / 2\right)t\right] / \sigma\sqrt{t}$$

D is the value of the debt,

T is the maturity of debt,

L is relative level at which the company defaults.

5. A method in accordance with claim 1 and further comprising the step of calculating the credit default spread (CDS(t)) for very short maturities of the company in accordance with the formula

$CDS(t) \to \lambda(1-R)$ when $t \to 0$,

wherein R is a recovery level for a selected debt seniority.

6. A system for calculating the financial status of a company, comprising:

a processor;

a memory connected to the processor and storing instructions for controlling the operation of the processor;

the processor operative with the instructions in the memory to perform the steps of calculating the company's value in accordance with the formula

$$\frac{dV}{V} = (r + \lambda)dt + \sigma dW - dN$$

wherein

V is the value of the company,

r is the risk neutral rate,

λ is the intensity of jump arrivals,

σ is the company's volatility,

$N)$ is the standard Poisson process,

W is the standard Wiener process,

and t is a time between 0 and T, the maturity of the debt; and

using the company value to calculate a financial metric for the company.

7. The system of claim 6 wherein the financial metric is the equity value of a company in accordance with the formula

$$S = VN(d_+) - e^{-(r+\lambda)T} DN(d_-) - V(LD/V)^{2(r+\lambda)/\sigma^2+1} N(f_+) + e^{-(r+\lambda)T} D(LD/V)^{2(r+\lambda)/\sigma^2-1} N(f_-);$$

wherein like variables to those defined above define the same values and wherein

$$d_\pm = \left[\ln(S/D) + \left(r + \lambda \pm \sigma^2/2\right)T\right]/\sigma\sqrt{T}$$

$$f_\pm = \left[\ln\left(L^2D/V\right) + \left(r + \lambda \pm \sigma^2/2\right)T\right]/\sigma\sqrt{T}$$

D is the value of the debt,

T is the maturity of debt, and

L is relative level at which the company defaults.

8. The system of claim 6 wherein the financial metric is the debt value of a company in accordance with the formula

$$\delta = VN(d_-) + e^{-(r+\lambda)T} DN(d_-) + V(LD/V)^{2(r+\lambda)/\sigma^2+1} N(f_+) - e^{-(r+\lambda)T} D(LD/V)^{2(r+\lambda)/\sigma^2-1} N(f_-);$$

wherein like variables to those defined above define the same values and wherein

$$d_\pm = \left[\ln(S/D) + \left(r + \lambda \pm \sigma^2/2\right)T\right]/\sigma\sqrt{T}$$

$$f_\pm = \left[\ln\left(L^2D/V\right) + \left(r + \lambda \pm \sigma^2/2\right)T\right]/\sigma\sqrt{T}$$

D is the value of the debt,

T is the maturity of debt, and

L is relative level at which the company defaults.

9. The system of claim 6 wherein the financial metric is the survival probability of a company in accordance with the formula

$$Q(t) = e^{-\lambda T}\left[N(g_+) - (LD/V)^{2r/\sigma^2} N(g_-)\right], \quad t < T$$

wherein like variables to those defined above define the same values and wherein

$g_{\pm} = \left[\pm \ln(V / LD) + \left(r + \lambda - \sigma^2 / 2\right)t\right] / \sigma \sqrt{t}$

D is the value of the debt,

T is the maturity of debt,

L is relative level at which the company defaults.

10. A system in accordance with claim 6 and further comprising the step of calculating the credit default spread (CDS(t)) for very short maturities of the company in accordance with the formula

$CDS(t) \rightarrow \lambda(1 - R)$ when $t \rightarrow 0$,

wherein R is a recovery level for a selected debt seniority.

11. A system for calculating the financial status of a company, comprising:

means for calculating the company's value in accordance with the formula

$$\frac{dV}{V} = (r + \lambda)dt + \sigma dW - dN$$

wherein

V is the value of the company,

r is the risk neutral rate,

λ is the intensity of jump arrivals,

σ is the company's volatility,

N) is the standard Poisson process,

W is the standard Wiener process,

and t is a time between 0 and T, the maturity of the debt; and

means for using the company value to calculate a financial metric for the company.

12. A method of calculating the financial status of a company, comprising the steps of:

determining the company's value in accordance with the formula

$$\frac{dV}{V} = (r - \lambda\kappa)dt + \sigma dW + \left(e^J - 1\right)dN$$

wherein

N is the standard Poisson process with intensity λ,

J is a normal variable with mean j and standard deviation k;

W is the standard Wiener process,

V is the value of the company,

r is the risk neutral rate of the company,

σ is the company volatility,

λ is the intensity of the jump arrival,

t is calendar time between today and maturity T; and

determining that the company defaults if at a sequence of discrete observational times $t_0 = 0(today), t_1, t_2, \ldots, t_N = T(maturity)$ the value of the company $V_n = V(t_n)$ falls below a corresponding barrier level $B_1, B_2, \ldots, B_N = D$, the barrier levels selected to represent different debt amounts which come due at corresponding times $t_0 = 0(today), t_1, t_2, \ldots, t_N = T(maturity)$.

13. The method of claim 12 and further comprising calculating the transitional probability density function (*TPDF*) for the value of the company conditional on no default occurring between time $t = 0$ and an observational time t_X comprising the steps of:

selecting a range for the natural logarithm of the value of the company *U=ln(V)*:

$U_{\min} < U < U_{\max}$

where

$$U_{\min} = -nstdiv\sqrt{(\sigma^2 + k^2)T} + \min(r - \lambda\kappa - \sigma^2/2, 0)T$$

and

$$U_{\max} = nstdiv\sqrt{(\sigma^2 + k^2)T} + \max(r - \lambda\kappa - \sigma^2/2, 0)T$$

and where *nsd* is the number of standard deviations used to characterize the extreme values of the natural logarithm of the value of the company;

dividing the range into an equidistant grid $u_0 = U_{\min}, u_1, \ldots, u_m, \ldots u_M = U_{\max}$ of M steps, with each grid step, denoted by *h,* equal to $h = (U_{\max} - U_{\min})/M$, with the total number of points in the grid, which is equal to *M+1*, being a power of 2;

defining the integer $\mu = floor(-U_{\min}/h)$, where *floor(.)* is a mathematical function, which for every number defines an integer less than or equal to this number;

constructing the modified grid as: $\tilde{u}_m = (m - \mu)h,\ m = 0,1,\ldots,M.$;

defining a grid on the line representing the value of the company using the following formula

$v_m = V_0 \exp(u_m) \quad m = 0,1,\ldots, M$

where the initial value of the company V_0 is equal to V_μ ; and

calculating on the grid the probability that the company will have a value of v_m at time t_n by the vector $P_n = (p_{0,n},\ldots, p_{m,n},\ldots, p_{M,n})$ where initial vector $P_0 = \left(0,\ldots,\underset{\mu}{1/h},\ldots,0\right)$.,

14. A method in accordance with claim 13 wherein the step of determining the transitional probability that the company will have a value of v_m at time t_n comprises the steps of:

determining the unconditional probability vector $\overline{P}_1$ in accordance with the formula

$$\overline{P}_1 = \hat{T}_{0,1} P_0$$

wherein $\hat{T}_{0,1}$ is the transition operator between the times t_0 and t_1 for the equation

$$\frac{dV}{V} = (r - \lambda\kappa)dt + \sigma dW + \left(e^J - 1\right)dN$$

wherein like variables to those defined above define the same values and wherein; and

applying a projection operator $\hat{\Pi}_1$ to vector $\overline{P}_1$ in order to obtain the vector P_1:

$$P_1 = \hat{\Pi}_1 \overline{P}_1.$$

15. A method in accordance with claim 14 and further comprising the step of determining selected financial characteristics of the company as a function of the at least one probability vector *P*.

16. A method in accordance with claim 15 and further comprising the step of calculating the survival probability of the company in accordance with the equation

$$Q_n = \sum_{m=0}^{M} P_{m,n}$$

where

m is an index changing from *0 to M,*

M is the total number of grid points,

n is an index changing from *0 to N*, and

N is the total number of times when company value is observed.

17. A method in accordance with claim 15 and further comprising the step of calculating the equity value of the company in accordance with the equation

$$S = e^{-rT} \sum_{m=0}^{M} P_{m,N} \max(v_m - B_N, 0).$$

where

r is the interest rate,

T is the maturity of debt,

m is an index changing from 0 *to* M,

v_m represents the value of the company,

N is the total number of times when company value is observed,

M is the total number of grid points, and

B_N is the terminal debt level.

18. A method in accordance with claim 15 and further comprising the step of calculating the present value of company debt δ in accordance with the equation

$$\delta = e^{-rT} \sum_{m=0}^{M} P_{m,N}$$

where

r is the interest rate,

T is the maturity of debt,

N is the total number of times when company value is observed,

m is an index changing from 0 *to* M, and

M is the total number of grid points.

19. A method in accordance with claim 16 and further comprising the step of calculating the credit default spread CDS in accordance with the equation

$$CDS_n = (1-R)\left(\frac{1 - e^{-rt_n} Q_n}{\tfrac{1}{2} e^{-rt_0}(t_1 - t_0) + \tfrac{1}{2} \sum_{n'=1}^{n-1} e^{-rt_{n'}} (t_{n'+1} - t_{n'-1}) + \tfrac{1}{2} e^{-rt_n}(t_n - t_{n-1})} - r \right)$$

where

r is the interest rate,

t_n is the observational time between today and maturity T,

R is a recovery level for a selected debt seniority,

n is an index changing from *1 to N*, and

n' is an index changing from 1 to n-1.

20. A method in accordance with claim 15 wherein the step of determining the value of a vector P_n is performed with the transition operators $\hat{T}_{0,1}$ being a Toeplitz matrix.

21. A method in accordance with claim 20 wherein the step of determining the value of a vector P_n is performed using a Fast Fourier Transform.

22. A system for calculating the financial status of a company, comprising:

a processor;

a memory connected to the processor and storing instructions for controlling the operation of the processor;

the processor operative with the instructions in the memory to perform the steps of determining the company's value in accordance with the formula

$$\frac{dV}{V} = (r - \lambda\kappa)dt + \sigma dW + \left(e^{J} - 1\right)dN$$

wherein

N is the standard Poisson process with intensity λ,

J is a normal variable with mean j and standard deviation k;

W is the standard Wiener process,

V is the value of the company,

r is the risk neutral rate of the company,

σ is the company volatility,

λ is the intensity of the jump arrival,

t is calendar time between today and maturity T; and

determining that the company defaults if at a sequence of discrete observational times $t_0 = 0(today), t_1, t_2, \ldots, t_N = T(maturity)$ the value of the company $V_n = V(t_n)$ falls below a corresponding barrier level $B_1, B_2, \ldots, B_N = D$, the barrier levels selected to represent different debt amounts which come due at corresponding times $t_0 = 0(today), t_1, t_2, \ldots, t_N = T(maturity)$.

23. The system of claim 22 and further comprising calculating the transitional probability density function (*TPDF*) for the value of the company conditional on no default occurring between time $t = 0$ and an observational time t_x comprising the steps of:

selecting a range for the natural logarithm of the value of the company *U=ln(V):*

$U_{\min} < U < U_{\max}$,

where

$$U_{\min} = -nstdiv\sqrt{(\sigma^2 + k^2)T} + \min(r - \lambda\kappa - \sigma^2/2, 0)T$$

and

$$U_{\max} = nstdiv\sqrt{(\sigma^2 + k^2)T} + \max(r - \lambda\kappa - \sigma^2/2, 0)T$$

and where *nsd* is the number of standard deviations used to characterize the extreme values of the natural logarithm of the value of the company;

dividing the range into an equidistant grid $u_0 = U_{\min}, u_1, \ldots, u_m, \ldots u_M = U_{\max}$ of M steps, with each grid step, denoted by *h,* equal to $h = (U_{\max} - U_{\min})/M$, with the total number of points in the grid, which is equal to *M+1*, being a power of 2;

defining the integer $\mu = floor(-U_{\min}/h)$, where *floor(.)* is a mathematical function, which for every number defines an integer less than or equal to this number;

constructing the modified grid as: $\tilde{u}_m = (m - \mu)h,\ m = 0,1,\ldots,M.$;

defining a grid on the line representing the value of the company using the following formula

$v_m = V_0 \exp(u_m) \quad m = 0,1,\ldots, M$

where the initial value of the company V_0 is equal to V_μ ; and

calculating on the grid the probability that the company will have a value of v_m at time t_n by the vector $P_n = (p_{0,n}, \ldots, p_{m,n}, \ldots, p_{M,n})$ where initial vector $P_0 = \left(0,\ldots,\underset{\mu}{1/h},\ldots,0\right)$.,

24. The system of claim 23 wherein the step of determining the transitional probability that the company will have a value of v_m at time t_n comprises the steps of:

determining the unconditional probability vector $\overline{P}_1$ in accordance with the formula

$$\overline{P}_1 = \hat{T}_{0,1} P_0$$

wherein $\hat{T}_{0,1}$ is the transition operator between the times t_0 and t_1 for the equation

$$\frac{dV}{V} = (r - \lambda\kappa)dt + \sigma dW + \left(e^J - 1\right)dN$$

wherein like variables to those defined above define the same values and wherein; and

applying a projection operator $\hat{\Pi}_1$ to vector $\overline{P}_1$ in order to obtain the vector P_1:

$$P_1 = \hat{\Pi}_1 \overline{P}_1.$$

25. The system of claim 24 and further comprising the step of determining selected financial characteristics of the company as a function of the at least one probability vector *P*.

26. The system of claim 25 and further comprising the step of calculating the survival probability of the company in accordance with the equation

$$Q_n = \sum_{m=0}^{M} P_{m,n}$$

where

m is an index changing from *0 to M,*

M is the total number of grid points,

n is an index changing from *0 to N*, and

N is the total number of times when company value is observed.

27. The system of claim 25 and further comprising the step of calculating the equity value of the company in accordance with the equation

$$S = e^{-rT} \sum_{m=0}^{M} P_{m,N} \max(v_m - B_N, 0).$$

where

r is the interest rate,

T is the maturity of debt,

m is an index changing from *0 to M,*

v_m represents the value of the company,

N is the total number of times when company value is observed,

M is the total number of grid points, and

B_N is the terminal debt level.

28. The system of claim 25 and further comprising the step of calculating the present value of company debt δ in accordance with the equation

$$\delta = e^{-rT} \sum_{m=0}^{M} P_{m,N}$$

where

r is the interest rate,

T is the maturity of debt,

N is the total number of times when company value is observed,

m is an index changing from *0 to M,* and

M is the total number of grid points.

29. The system of claim 26 and further comprising the step of calculating the credit default spread CDS in accordance with the equation

$$CDS_n = (1-R)\left(\frac{1-e^{-rt_n}Q_n}{\frac{1}{2}e^{-rt_0}(t_1-t_0)+\frac{1}{2}\sum_{n'=1}^{n-1} e^{-rt_{n'}}(t_{n'+1}-t_{n'-1})+\frac{1}{2}e^{-rt_n}(t_n-t_{n-1})} - r \right)$$

where

r is the interest rate,

t_n is the observational time between today and maturity T,

R is a recovery level for a selected debt seniority,

n is an index changing from *1 to N*, and

n' is an index changing from 1 to n-1.

30. The system of claim 25 wherein the step of determining the value of a vector P_n is performed with the transition operators $\hat{T}_{0,1}$ being a Toeplitz matrix.

31. The system of claim 30 wherein the step of determining the value of a vector P_n is performed using a Fast Fourier Transform.

32. A system for calculating the financial status of a company, comprising:

means for determining the company's value in accordance with the formula

$$\frac{dV}{V} = (r - \lambda\kappa)dt + \sigma dW + (e^{J} - 1)dN$$

wherein

N is the standard Poisson process with intensity λ,

J is a normal variable with mean j and standard deviation k;

W is the standard Wiener process,

V is the value of the company,

r is the risk neutral rate of the company,

σ is the company volatility,

λ is the intensity of the jump arrival,

t is calendar time between today and maturity T; and

means for determining that the company defaults if at a sequence of discrete observational times $t_0 = 0(today), t_1, t_2, \ldots, t_N = T(maturity)$ the value of the company $V_n = V(t_n)$ falls below a corresponding barrier level $B_1, B_2, \ldots, B_N = D$, the barrier levels selected to represent different debt amounts which come due at corresponding times $t_0 = 0(today), t_1, t_2, \ldots, t_N = T(maturity)$.

33. A method operable on a computer for calculating the financial status of a company, comprising the steps of:

calculating the value over time of a company in accordance with Zhou's model;

determining that the company defaults if at a sequence of discrete observational times the value of the company falls below a corresponding barrier level;

the barrier levels selected to represent different debt amounts which come due at corresponding times; and

calculating the transitional probability density function for the value of the company conditional on no default occurring between an initial time and an observational time using a probability vector P.

34. A method in accordance with claim 33 wherein the probability vector P is determined using a projection operator nullifying the components of the probability vector below the barrier and further comprising the step of determining selected financial characteristics of the company as a function of the probability vector *P*.

35. A method in accordance with claim 34 wherein the financial characteristic is selected from the group comprising the equity value of a company, the debt value of a company, the survival probability of a company and the value of the credit default spread.

36. The method of claim 34 wherein the step of determining the value of the probability vector P is performed with a transition operators $\hat{T}_{0,1}$ being a Toeplitz matrix.

37. The method of claim 36 wherein the step of determining the value of the probability vector P is performed using a Fast Fourier Transform.

38. A system for calculating the financial status of a company, comprising the steps of:

a processor;

a memory connected to the processor and storing instructions to control the operation of the processor to perform the steps of

calculating the value over time of a company in accordance with Zhou's model;

determining that the company defaults if at a sequence of discrete observational times the value of the company falls below a corresponding barrier level;

the barrier levels selected to represent different debt amounts which come due at corresponding times; and

calculating the transitional probability density function for the value of the company conditional on no default occurring between an initial time and an observational time using a probability vector *P*.

39. A system in accordance with claim 38 wherein the probability vector P is determined using a projection operator nullifying the components of the probability vector below the barrier and further comprising the step of determining selected financial characteristics of the company as a function of the probability vector *P*.

40. A system in accordance with claim 39 wherein the financial characteristic is selected from the group comprising the equity value of a company, the debt value of a company, the survival probability of a company and the value of the credit default spread.

41. a system in accordance with claim 40 wherein the step of determining the value of the probability vector P is performed with a transition operators $\hat{T}_{0,1}$ being a Toeplitz matrix.

42. A system in accordance with claim 41 wherein the step of determining the value of the probability vector P is performed using a Fast Fourier Transform.

43. A system for calculating the financial status of a company, comprising:

means for calculating the value over time of a company in accordance with Zhou's model;

means for determining that the company defaults if at a sequence of discrete observational times the value of the company falls below a corresponding barrier level;

the barrier levels selected to represent different debt amounts which come due at corresponding times; and

means for calculating the transitional probability density function for the value of the company conditional on no default occurring between an initial time and an observational time using a probability vector P.

44. A program product operable on a computer to control the operation of the computer to calculate the financial status of a company, the program product comprising a computer-readable medium storing instructions to perform the steps of:

calculating the value over time of a company in accordance with Zhou's model;

determining that the company defaults if at a sequence of discrete observational times the value of the company falls below a corresponding barrier level;

the barrier levels selected to represent different debt amounts which come due at corresponding times; and

calculating the transitional probability density function for the value of the company conditional on no default occurring between an initial time and an observational time using a probability vector P.